

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A temperature sensor comprising:

a cylindrical metal tube extending in an axial direction and having a front end-side ~~blocked~~ portion including a sidewall and a closed bottom;

a thermal sensing element held in an inside of said metal tube and including a thermal sensing portion with electrical characteristic varying according to a temperature, and a pair of electrode wires provided in said thermal sensing portion and extending toward a rear end-side portion of said metal tube; and

a sheath member held in an inside of said metal tube and including a sheath pipe in which a pair of metal cores connected to said pair of electrode wires of said thermal sensing element are held while electrically insulated, wherein:

said metal tube has a small-diameter portion located on-a said front end-side portion and entirely having an inner diameter smaller than an outer diameter of said sheath member, and a large-diameter portion located on a rear end-side portion of said small-diameter portion and having a diameter larger than an outer diameter of said small-diameter portion; and

said thermal sensing portion is held in said small-diameter portion and an electrically insulating member is filled at least in between a front end of said thermal sensing portion and-a ~~front end of~~ an inner wall of the closed bottom of said metal tube.

2. (currently amended): The temperature sensor as claimed in claim 1, wherein a longest distance H ~~between a said~~ front end of said thermal sensing portion and ~~a front end of an~~ inner wall of the closed bottom of said metal tube is not larger than 2.0 mm.

3. (previously presented): The temperature sensor as claimed in claim 1, wherein:

a shortest distance L between said thermal sensing portion and said metal tube satisfies $0 \leq L \leq 0.3$ mm; and an outer diameter of said small-diameter portion is not larger than 3.5 mm.

4. (previously presented): The temperature sensor as claimed in claim 1, wherein an average filling rate of said electrically insulating member is not lower than 75 %.

5. (previously presented): The temperature sensor as claimed in claim 1, wherein a heat conductivity of said electrically insulating member is not lower than 1.2 W/m·K.

6. (previously presented): The temperature sensor as claimed in claim 1, wherein said electrically insulating member is a material containing alumina as a main component.

7. (currently amended): The temperature sensor as claimed in claim 1, wherein said electrically insulating member is filled at least in a whole of a space ranging from ~~a front end~~ an inner wall of the closed bottom of said metal tube to a rear end of said thermal sensing portion.

8. (previously presented): The temperature sensor as claimed in claim 1, wherein said electrically insulating member is filled at least in a whole of said small-diameter portion.

AMENDMENT UNDER 37 C.F.R. §1.111
U.S. Appln. No. 10/527,437

9. (currently amended): The temperature sensor as claimed in claim 1, wherein a rear end of said electrically insulating member is located on a front end-~~side~~ portion viewed from a front end of said sheath pipe.

10. (previously presented): The temperature sensor as claimed in claim 7, wherein an adiabatic member is provided between a rear end of said electrically insulating member and a front end of said sheath pipe.

11. (currently amended): The temperature sensor as claimed in claim 1, wherein all regions of said pair of electrode wires located on a rear end-~~side~~ portion viewed from a rear end of said thermal sensing portion are disposed in said large-diameter portion.

12. (new): The temperature sensor as claimed in claim 1, wherein said front end of the thermal sensing portion is in contact with the inner wall of said closed bottom of the metal tube through the electrically insulating member.